

Application No.: 10/550423
Docket No.: DC8507UI3PCT1
Response to Non-final Office Action of 06 Sep 2007

Page 6

REMARKS**Status of the Claims**

Claims 1-4, 12-14 are active.

Claims 5-11 are cancelled.

Claims 22 - 24 are new.

Claims 1-4, 12, 13, 15-17 and 19 have been amended.

Claim 22 is new and includes the limitations of presently amended Claims 1 and claims 12. Claim 23 depends from Claim 22. Claim 24 depends from Claim 1 and support is found in Claims 19 and 2.

Support for the amendments are found in original claims and throughout the specification. Specifically support for the localized heating and localized impregnation is found in ¶¶ 51, 55. Specific support for the electroconductive gas diffusion layer and its abutment with the electroconductive separator plate is found in ¶¶ 37, 47 and Figure 1a.

No new matter has been added.

Applicants traverse and the reasons are presented below.

Rejections**35 U. S. C. 112**

Applicants have amended Claims 12 and 13 which now state that the thermoplastic polymer is a blend of the maleic anhydride polymer, partially fluorinated polymers and liquid crystalline polymer. Accordingly, Applicants respectfully request removal of this ground of rejection.

Statutory-Type (35 U.S.C. 101) Double Patenting

Claims 1, 2 and 18-21 have been provisionally rejected over claims 39-44 of U.S. App. No. 10/550423.

Application No.: 10/550423
Docket No.: DC8507U;PCT1
Response to Non-final Office Action of 06 Sep 2007

Page 7

Applicants traverse this rejection because the scope of the process of U.S. App. No. 10/550422 is broader than the scope of the currently amended product claims of the present invention. For example, the process of the U.S. App. No. 10/550422 could be used to make electrochemical cells having separator plates made from a wide variety of polymers, not just thermoplastic polymer and conductive fillers recited in the present application. In addition, the electrochemical cell component of the present invention can be made by processes other than the welding process recited in the claims of U.S. App. No. 10/550442. Accordingly, the present application and U.S. App. No. 10/550442 are not drawn to identical subject matter and the double patenting rejection should be withdrawn.

35 U.S.C. 102(b)

Davis

Claims 1-4, 14-17 and 19-21 have been rejected over GB 2 326 017A to Davis et al. [Davis]. The claims as amended recite elements that are not disclosed nor described in the reference.

Applicants note that Davis does not disclose an electrochemical cell with a gas diffusion layer (GDL). Davis merely mentions heat lamination of the landing surface to the cathode and anode electrodes. See Davis at page 6, lines 14-28. Amended claim 1 provides that the GDL is positioned between a electroconductive separator plate and the electrode. Claim 1 is directed to *localized impregnation* of thermoplastic polymer of the landing surface of the separator plate within the pores of this GDL. This structural feature allows conductive fillers in the electroconductive separator plate to maintain electrical contact with the GDL. Additionally, the localized impregnation of the thermoplastic polymer of the landing surface of the separator plate into the pores of the GDL provides for localized joining of the GDL to the landing surface. By sharp contrast, in Davis, the entire plate is adhered to the MEA electrode, either directly or by way of an adhesive layer inserted between the plates and the electrode. Thus, Applicants contend that Davis does not anticipate independent claim 1 of the present application.

The Examiner also rejected claims 2-4, 14-17 and 19-21, which depend from independent claim 1, as being anticipated by Davis. As amended, dependant claim 2 specifies that the GDL is locally joined to the separator plate at multiple landing surfaces, which

Application No.: 10/550423
Docket No.: DC8507USPCT1
Response to Non-final Office Action of 06 Sep 2007

Page 8

landing surfaces are separated by open flow field channels. Claim 2 further provides that the GDL is locally joined to the landing surface by a localized heating technique selected from a number of welding techniques. As discussed above, Davis does not disclose or suggest the localized joining of a GDL to the landing surfaces of an electroconductive separator plate. For these further reasons, claims 2 and 3 are not anticipated by Davis. Dependant claim 19 further specifies that the GDL does not sink into the open field flow channels that separates the landing surfaces to which the GDL is locally joined. As Davis does not disclose an electroconductive GDL, it also does not disclose a GDL that is locally joined to the landing surfaces of the separator plate, but which does not sink into the open flow field channels separating those landing surfaces. For these further reasons, dependant claim 19 is not anticipated by Davis. For the reasons stated with regard to independent claim 1, and for the additional reasons stated in this paragraph, Applicants respectfully request removal of the rejection of claims 2, 14-17 and 19-21.

35 U.S.C. 103(a)

Davis

Claims 3 and 18 were alternatively rejected under 35 U.S.C. 103(a) as being obvious in view of Davis.

As discussed above, Davis does not disclose or describe the limitations of the present invention. It is predictable that Davis's heat lamination approach using pressure and heat will form insulative adhesive polymer layers and not the localized impregnated pores. Thus Davis *teaches away* from the present invention.

With respect to Claim 18 rejection, the Examiner states that the electrochemical cell component of Davis has inherently lower resistivity. As noted above, Applicants' invention provides for adhesion between the GDL and the landing surface while maintaining electrical contact. Having the GDL and landing surface of the electroconductive separator plates joined together prevents slippage of the layers during manufacturing. Slippage of layers during manufacturing causes defects such as wrinkles and results in lower conductivity (higher resistivity). Applicants were concerned about preventing these defects. Thus, Applicants submit that a GDL and an electroconductive separator plate that are not joined together do not

Application No.: 10/550423
Docket No.: DC8507USPCT1
Response to Non-final Office Action of 06 Sep 2007

Page 9

the naturally result in lower resistivity. Accordingly, Applicants respectfully submit that claims 3 and 18 are not rendered obvious by Davis.

Davis in view of Takagi

Claims 12 and 13 were rejected as unpatentable over Davis in view of U.S. Patent 7,008,991 to Takagi et al. [Takagi]. The Examiner states that the percentages of maleic anhydride polymers and liquid crystalline polymer of Takagi could be optimized through routine experimentation to arrive at the Applicants' invention. Applicants traverse because Takagi is not concerned with adhesion by locally impregnating pores of the GDL with thermoplastic of the landing surface of an electroconductive separator plate. Applicants' thermoplastic with 1-20 wt% of maleic anhydride modified polymer facilitates localized impregnation within the pores of the GDL at the landing surface of the separator plate, while maintaining contact between the GDL and the conductive particles in the separator plate. A skilled artisan would not envision or arrive at the present invention through routine experimentation. Accordingly, Applicants respectfully request removal of this ground of rejection.

Davis in view of Koji

Claims 12 and 13 were rejected as unpatentable over Davis in view of JP 2002-275373 to Koji et al. [Koji]. The claims as amended recite elements that are not disclosed in either reference nor constitute a predictable result of the combination. Koji discloses reacting maleic anhydride with a diamine to form a polymer. Koji does not disclose the thermoplastic blend of maleic modified polymer as disclosed by the Applicants. Nor does Koji teach the localized impregnated pores of present invention. It well understood that the bulk mechanical properties can vary differently and is not predictive of the adhesion of the localized impregnated structures of the present invention. Accordingly Applicants respectfully request removal of this ground of rejection.

Application No.: 10/550423
Docket No.: DC8507USPCT1
Response to Non-final Office Action of 06 Sep 2007

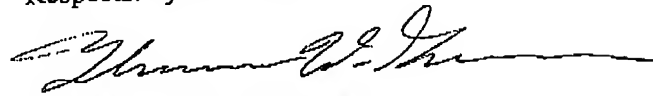
Page 10

Conclusion

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Please charge any unaccounted fee that may be due, to Deposit Account No. 04-1928
(E. I. du Pont de Nemours and Company).

Respectfully submitted,



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